Characterization of Candidatus Liberibacter asiaticus isolated from Citrus grandis and Citrus reticulata based on 16S rDNA and outer membrane protein (OMP) genes.

ABSTRACT

Molecular characterization of the local isolates of Candidatus Liberibacter asiaticus was carried out based on morphological properties, 16S rDNA and outer membrane protein (OMP) genes. A transmission electron microscopic (TEM) study revealed that both GFB-Pummelo and GFB-Mandarin (PK) were morphologically similar, suggesting that this method is not suitable to differentiate between them. A study on 16S rDNA genes of both isolates also showed no significant difference between them. Both isolates had very high nucleotide similarity (99%) and gave the lowest evolutionary value (0.30), suggesting that they are very close. However, significant difference was observed in their OMP gene sequences. Comparison of the nucleotide sequences of the OMP gene showed high nucleotide similarity (99%) but the evolutionary distance values was also high (0.68). Based on phylogenetic tree analysis, they were clustered in different groups, suggesting that some genetic variation occurred. Comparison of amino acids sequence also showed high amino acids similarity (98%) and high evolutionary distance value (3.41). They were clustered in different groups in the phylogenetic tree analysis. Further analysis of the amino acids sequence revealed 11 amino acids substitutions, which further proved that they belong to different strain of Candidatus Liberibacter asiaticus.

Keyword: Citrus greening disease; Huanglongbing (HLB); Candidatus liberibacter asiaticus; Molecular characterization; 16SrDNA gene; Outer membrane protein gene (OMP).